Tier II Data Validation Report Summary

Client: Chevron Environmental Management Company (EMC) Cincinnati	Laboratory: Lancaster Laboratories, Inc.
Project Name: 2nd Semiannual 2009 GW Sampling	Sample Matrix: Groundwater
Project Number: 500-017-012	Sample Start Date: December 7, 2009
Date Validated: February 19, 2010	Sample End Date: December 8, 2009
Parameters Included: Volatile Organic Compounds (VOC) by Solid Waste-846 (SW-846) Method 8260B; Total Petroleum Hydrocarbons (TPH) as gasoline range organics (GRO) water C6-C10 and TPH as diesel range organics (DRO) water C10-C28 by SW-846 Method 8015B; Methane by SW-846 Modified Method 8015B; Total and Dissolved Metals by SW-846 Method 6010B; Ferric Iron by SW-846 Modified Method 6010B; Chloride and Sulfate by Environmental Protection Agency (EPA) Method 300.0; Kjeldahl Nitrogen by EPA Method 351.2; Nitrate Nitrogen and Nitrite Nitrogen by EPA Method 353.2; Chemical Oxygen Demand (COD) by EPA Method 410.4; Alkalinity by Standard Method 20th Edition (SM20) 2320 B; Total Organic Carbon (TOC) by Method SM20 5310 C; Ferrous Iron by Modified Method SM20 3500 Fe B; Sulfide by Method SM20 4500 S2 D; and Ammonia Nitrogen by Modified Method SM20 4500NH3 B/C	
Laboratory Project ID: 1174352	
Data Validator: Tim Gunn, CHMM	

DATA EVALUATION CRITERIA SUMMARY

A Tier II Data Validation was performed by Trihydro Corporation's Chemical Data Evaluation Services group on the analytical data report package generated by Lancaster Laboratories evaluating samples from the Chevron EMC site located in Cincinnati, Ohio.

Precision, accuracy, method compliance, and completeness of this data package were assessed during this data review. Precision was determined by evaluating the calculated relative percent difference (RPD) values of samples from field and laboratory duplicate pairs. Laboratory accuracy was established by reviewing the demonstrated percent recoveries of matrix spike (MS) and matrix spike duplicate (MSD) samples, and of laboratory control samples (LCS) and laboratory control sample duplicates (LCSD) to verify that none of the data were biased. Additionally, field accuracy was established by collecting a field and trip blank sample to monitor for possible ambient or cross contamination during sampling. Method compliance was established by reviewing holding times, detection limits, surrogate recoveries, method blanks, and the LCS and LCSD percent recoveries against method specific requirements. Completeness was evaluated by determining the overall ratio of the number of samples planned versus the number of samples with valid analyses. Determination of completeness included a review of the chain-of-custody, laboratory analytical methods, and any other necessary documents associated with this analytical data set.

Data were evaluated in general accordance with validation criteria set forth in the USEPA Contract Laboratory Program (CLP) National Functional Guidelines for Superfund Organic Methods Data Review, document number USEPA-540-R-08-01, June 2008 with additional reference to USEPA Contract Laboratory Program (CLP) National Functional Guidelines for Organic Data Review, document number EPA 540/R-99-008 of October 1999 and the USEPA CLP National Functional Guidelines for Inorganic Data Review, document number EPA 540R-04-004, October 2004. Review of duplicates is conducted in accordance with USEPA Region 1 Laboratory Data Validation Function Guidelines for Evaluation of Organic Analysis, December 1996.

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SAMPLE NUMBERS TABLE

Client Sample ID	Laboratory Sample Number
MW-10, 120709	5858905
MW-10, Filtered, 120709	5858906
MW-38, 120809	5858907
MW-38, Filtered 120809	5858908
FB-2, 120809	5858909
MW-21, 120809	5858910
MW-21, Filtered, 120809	5858911
BD-3, 120809	5858912
BD-3, Filtered 120809	5858913
Trip Blank, 120809	5858914

The samples were analyzed for client-specified analytes. Chain-of-custody (COC) completeness is included in Section #3. The laboratory data were reviewed to evaluate compliance with the required methods and the quality of the reported data. A leading check mark (✓) indicates that the referenced data were deemed acceptable. A preceding crossed circle (⊗) signifies problems with the referenced data that may have warranted attaching qualifiers to the data.

- ✓ Data Completeness
- ✓ COC Documentation
- ⊗ Holding Times and Preservation
- ✓ Laboratory Blanks
- ✓ System Monitoring Compounds (i.e. Surrogates)
- ✓ Laboratory Control Samples/Laboratory Control Sample Duplicates (LCS/LCSD)
- ⊗ Matrix Spike/Matrix Spike Duplicates (MS/MSD)
- ✓ Laboratory Duplicates
- ✓ Field Duplicates
- ✓ Field blank and Trip Blank

OVERALL DATA PACKAGE ASSESSMENT

Based on a data validation review, the data are acceptable as delivered. Data qualified by the laboratory are discussed in Section #2.

The purpose of validating data and assigning qualifiers is to assist in proper data interpretation. Data which are not qualified meet the site data quality objectives. If values are assigned qualifiers other than an R, the data may be used for site evaluation, with the reasons for qualification being given consideration when interpreting sample concentrations. Data points which are assigned an R qualifier should not be used for any site evaluation purposes. Data were qualified with J data flags by the laboratory if the result was greater than or equal to the method detection limit (MDL) but less than the limit of quantitation (LOQ). Laboratory J flags were preserved in the data and included in the Data Qualification Summary table at the end of this report.

Data qualifiers used during this validation included:

J – Estimated concentration

Data Completeness

The analyses appeared to be performed as requested on the chain-of-custody records. The associated samples were received by the laboratory and appeared to be analyzed properly. No data points were rejected. The data completeness measure for this data package is 100% and is acceptable.

VALIDATION CRITERIA CHECKLIST	
1. Was the report free of any non-conformances related to the analytical data identified by the laboratory?	No
Comments: The laboratory did not note any non-conformances related to the analytical data with the following exceptions. The reporting limit for chemical oxygen demand in sample MW-38, 120809 was raised due to matrix interference. The preservation requirements were not met for volatile analysis in sample BD-3, 120809. The laboratory noted that the vial submitted for volatile analyses did not have a pH <2 at the time of analysis. Due to the volatile nature of the analytes, it is not appropriate for the laboratory to adjust the pH at the time of sample pH. A pH = 3 was noted for the vial.	
2. Were data qualification flags or any other notes used by the laboratory? If yes, define.	Yes
Comments: The laboratory noted that the samples were filtered in the field for dissolved metals. The laboratory used the following data qualification flags with this data set. J – Estimated value (1) The result for one or both determinations was less than five times the limit of quantitation (LOQ). (2) The unspiked result was more than four times the spike added. *- Outside of specification	
3. Were sample COC forms complete?	Yes
Comments: The COC form was complete from the field to the laboratory with the following exception. The Custody was maintained as evidenced by proper signatures, dates, and times of receipt.	
4. Were detection limits in accordance with the QAPP, permit, or method?	Yes
Comments: The detection limits were found to be acceptable. Dilutions up to 500 times were applied to samples for TPH-GRO water C6-C10, TPH-DRO water C10-C28, benzene, chemical oxygen demand, chlorobenzene, ethylbenzene, toluene, xylenes (Total), methane, chloride, sulfate, and ferrous iron analyses. The final usability of the data with respect to dilutions will be determined by the project manager.	
5. Were the requested analytical methods in compliance with the QAPP, permit, or COC?	Yes
Comments: The requested analytical methods were in compliance with the COC and the attached analyte list, *Analytical Requests for Groundwater*.	
6. Were samples received in good condition within method specified requirements?	Yes
Comments: The samples were received in good condition and within the recommended temperature range of 4°C +/- 2°C at 2.9° – 3.5° C. The custody seals were present and intact.	
7. Were samples analyzed within method specified or technical holding times?	No
Comments: The samples were extracted or analyzed within method specified holding times with the following exception. **The ferrous iron analysis was performed past the immediate recommended analysis time. The modified Method SM20 3500 Fe B states that holding time is 24 hours but the procedure can also be used in the laboratory if it is understood that normal sample exposure to air during shipment may result in precipitation of iron. As a result, the data were accepted with qualification of J for detections.**	
8. Were reported units appropriate for the associated sample matrix/matrices and method(s) of analyses?	Yes
Comments: Sample results were reported in µg/L or mg/L, which are appropriate units for the requested analyses and the water matrix.	
9. Do the laboratory reports include all constituents requested to be reported?	Yes
Comments: The laboratory report included the requested constituents listed on the attached list, *Analytical Requests for Groundwater*.	

VALIDATION CRITERIA CHECKLIST	
10. Was there indication from the laboratory that the initial or continuing calibration verification results were within acceptable limits?	N/A
Comments: Initial and continuing calibration data were not included as part of this data set; however, these data are assumed to be acceptable as the laboratory did not note that any calibration verification results were outside acceptable limits.	
11. Was the total number of method blank samples prepared equal to at least 5% of the total number of samples, or analyzed as required by the method?	Yes
Comments: The total number of method blanks prepared was greater than 5% of the total number of samples.	
12. Were method blank samples free of analyte contamination?	Yes
Comments: There were no detections of the requested analytes reported in the method blank samples.	
13. Was the total number of matrix spike samples prepared equal to at least 5% of the total number of samples, or analyzed as required by the method?	Yes
Comments: The total number of matrix spike samples prepared was greater than 5% of the total number of samples. Matrix spikes were prepared for ferrous iron batch 09343834401A, and chloride/sulfate batch 09349196601B from sample MW-38, 120809. The remaining matrix spikes were prepared from samples not associated with this sampling event.	
14. Were MS/MSD percent recoveries and MS/MSD RPD values within data validation or laboratory quality control (QC) limits?	No
Comments: The project specific MS/MSD recoveries were within laboratory-specified limits or were not applicable since the result was greater than four times the spiked concentration with the following exceptions. **In sulfate batch 09349196601B, the MS percent recovery was above the limits of 90-110% at 132%. As a result of possible high bias, detections in the associated samples were qualified as J.** The MS and MSD spike recoveries and RPD values for non-project samples were considered but matrix similarity to project samples could not be guaranteed.	
15. Was the total number of LCSs analyzed equal to at least 5% of the total number of samples, or analyzed as required by the method?	Yes
Comments: Laboratory control samples were prepared on at least a 5% basis for the total number of samples.	
16. Were LCS/LCSD percent recoveries and LCS/LCSD RPD values within laboratory QC limits?	Yes
Comments: The LCS/LCSD percent recoveries and LCS/LCSD RPD values were within laboratory QC limits.	
17. Were surrogate recoveries within laboratory control limits?	Yes
Comments: Surrogate recoveries were within laboratory control limits.	
18. Was the number of equipment, trip, or field blanks collected equal to at least 10% of the total number of samples, or as required by the project guidelines, QAPP, SAP, or permit?	Yes
Comments: There was one trip blank (Trip Blank, 120809) and one field blank (FB-2, 120809) collected with the samples of this data set, which is greater than 10% the total number of samples.	
19. Were the trip blank, field blank, and/or equipment blank samples free of analyte contamination?	Yes
Comments: There were no detections of the requested analytes in the sample Trip Blank, 120809 or FB-2, 120809.	
20. Were the field duplicates collected equal to at least 10% of the total number of samples, or as required by the project guidelines, QAPP, SAP, or permit?	Yes
Comments: There was one field duplicate associated with this data set. The sample BD-3, 120809 was prepared as a duplicate of sample MW-21, 120809.	

VALIDATION CRITERIA CHECKLIST	
21. Were field duplicate RPD values within data validation QC limits (soil 0-50%, water 0-30%, or air 0-25%)?	Yes
Comments: Field duplicate RPD values were within QC limits.	
22. Were laboratory duplicate RPD values within laboratory-specified limits?	Yes
Comments: Laboratory duplicates were prepared for the following analyses including metals, nitrite nitrogen, TOC, COD, Kjeldahl nitrogen, chloride/sulfate, nitrate nitrogen, ferrous iron, ammonia nitrogen, sulfide, and alkalinity. Laboratory duplicates were prepared for ferrous iron batch 09343834401A, and chloride/sulfate batch 09349196601B from sample MW-38, 120809. The remaining laboratory duplicates were prepared from samples not associated with this data set. The project specific laboratory duplicate RPD values were within the data validation QC limits or were qualified by the laboratory with (1) indicating that the result for one or both determinations was less than five times the LOQ with the following exception.	

DATA QUALIFICATION SUMMARY

Analyte	Field Sample ID	Lab Sample ID	Result	Units	Reviewer Qualifier	Reviewer Qualifier Reason
Arsenic, Dissolved	BD-3,120809 Filtered	5858913	0.0101	mg/L	J	Flagged by the Lab: Result between MDL and RL.
Benzene	MW-10,120709	5858905	0.6	ug/L	J	Flagged by the Lab: Result between MDL and RL.
Chemical Oxygen Demand	MW-38,120809	5858907	92.2	mg/L	J	Flagged by the Lab: Result between MDL and RL.
Ethyl- benzene	MW-10,120709	5858905	5	ug/L	J	Flagged by the Lab: Result between MDL and RL.
Iron, Ferrous	MW-21,120809	5858910	19.2	mg/L	J	Sample was extracted outside of the acceptable holding time.
Iron, Ferrous	MW-38,120809	5858907	6.4	mg/L	J	Sample was extracted outside of the acceptable holding time.
Nitrogen, Kjeldahl	MW-21,120809	5858910	0.74	mg/L	J	Flagged by the Lab: Result between MDL and RL.
Nitrogen, Nitrite	MW-21,120809	5858910	0.028	mg/L	J	Flagged by the Lab: Result between MDL and RL.
Sulfate	MW-21,120809	5858910	23.7	mg/L	J	The MS and/or MSD recovery(ies) were above the acceptable limits indicating possible matrix interference.
Sulfate	MW-38,120809	5858907	1.5	mg/L	J	The MS and/or MSD recovery(ies) were above the acceptable limits indicating possible matrix interference.
Toluene	MW-10,120709	5858905	0.8	ug/L	J	Flagged by the Lab: Result between MDL and RL.
Xylenes, Total	MW-10,120709	5858905	2	ug/L	J	Flagged by the Lab: Result between MDL and RL.

DUPLICATE SUMMARY

Client Sample ID: MW-21, 120809 Field Duplicate Sample ID: BD-3, 120809			
Analyte	**Lab Result**	**Duplicate Result**	**Relative Percent Difference (RPD)**
Benzene	170	170	0.0%
Ethylbenzene	2500	2500	0.0%
Toluene	86	85	1.2%
Xylenes, Total	1600	1600	0.0%
TPH-GRO water C6-C10	17000	18000	5.7%
TPH-DRO water C10-C28	5000	5200	3.9%
Arsenic, Dissolved	ND (0.0072 mg/L)	0.0101	DL

Field duplicate RPD control limits should not exceed 30% for water, 50% for soil, or 25% for air or vapor as established by USEPA Region 1 Laboratory Data Validation Function Guidelines for Evaluation of Organic Analysis, December 1996.

DL – Indicates that one result was detected and one non-detect, and therefore an RPD could not be calculated. No data were qualified since the detection was within two times the reporting limit.